# AN OBSERVATIONAL STUDY ON CHILD PASSENGER SAFETY SEAT USE IN CENTRAL LOUISIANA

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## Abstract

***The purpose of this study was to determine the frequency of child passenger safety seats among children, specifically those aged 0-5, in the eight-parish area that make up Region VI, Central Louisiana. To obtain the needed information, direct observations were conducted at a total of 16 locations in all eight parishes, specifically at the parish health units and the major shopping center, in order to capture a representative sample of each parish's population. Some of the variables observed included whether or not the children were restrained, their seating position in the vehicle, the type of vehicle and whether or not the driver was wearing a seat belt. Results are presented as percentages. Of the 270 children that were observed, 244 were classified in the 0-5 age group and 26 were 5 or more years old. Study results indicate that only 35.7% (n=87) of the children less than or 5 years old were observed to be in child passenger safety seats and 9.4% (n=23) were restrained by the car's seat belt. A majority of these 0-5 year old children (73.8%) were placed in the back seat of the vehicle. Two hundred and seven (207) drivers were observed, and of that number, 55.1%(n=114) wore seat belts (59.6%, female and 41.2% male). Among the seat belted drivers, White females were more likely to wear seat belts (65%) than African Americans females, or males. Moreover, among the drivers, those estimated as being in the 21-30 age group were more likely to wear seat belts, (56.9%), than the drivers in any other age group. Furthermore, the children 5 years or less who traveled with seat belted drivers were more likely to be properly restrained ($\chi^2$=6.61, p-value=0.010). Based on the results of this study, it is evident that car safety education needs to be implemented or revisited throughout the region, and efforts should be made to encourage people to use safety seats when transporting their children. Moreover, safety laws and regulations need to be enforced.***

## Background

Central Louisiana, public health region VI, is a rural area located, as the name implies, in the central part of Louisiana and consists of eight parishes whose total population, according to the 2000 census, is 301,390. These eight parishes include Avoyelles (pop.41, 481), Catahoula (pop.10, 920), Concordia (pop.20, 247), Grant (pop.18, 698), LaSalle (pop. 14,282), Rapides (pop.126, 337), Vernon (pop.52, 531) and Winn (pop.16, 894).

## Introduction

Motor vehicle related accidents kill more children, unintentionally, than any other single cause in the United States [1,2]. To reduce the trauma suffered by children involved in traffic crashes, child safety seats should be used effectively. Safety seats in vehicles for infants and small children were designed in the 1960's to hold children in place during crashes, thus preventing them from being ejected or thrown into the instrument panel of the vehicle [3] and ultimately preventing injury or death.

Child passenger safety seats are generally of three types: those for infants, toddlers and young children. Infants only (rear facing) seats are intended for infants from birth to about one year; forward facing (convertible) seats are intended for toddlers who are 1–4 years and booster

seats are for children who are 4-7 years old. The weight of the child also plays a role in the type of safety seat used. For the three types of safety seats mentioned, the child's weight should range accordingly: birth weight to 20-22lbs, infant only seats; weight of up to 40lbs, toddler seats and weight of over 40lbs, and a height less than 4'9", booster seats. All seats should be placed in the rear of the vehicle [4,5].

In the United States, the incidence of injury to children who are either not restrained or improperly restrained when riding in vehicles is alarming. In 1998, nearly 600 children less than 4 years old died in motor vehicle crashes [2]. Approximately 29% of children aged 4 years and younger do not ride in appropriate child safety seat restraints, which when correctly installed and used, reduces the need for hospitalization by 69% among children less than 4 years, and reduces the risk of death by approximately 70% for infants and by 47% to 54% for toddlers 1-4 years old. Moreover rural areas have higher motor vehicle crash incidence and death rates, and crashes in these areas tend to be severe [2,6].

According to the results from an assessment of the use of safety restraints among Louisiana residents done from 1986-2001, by the Safe Kids Coalition, the use of seat belts by drivers and front seat passengers have increased with slight declines in 1988, 1992, 1998 and 2001[7]. On the other hand, the percent of children aged infant to less than 13 years who were restrained in vehicles during 1986-2001 increased, though with a marked decline in 1993 and 1994, and assessment for vehicle type and the frequency of restrained passengers showed that persons in Sports Utility Vehicles were more likely to be restrained than in other vehicles [7].

In Louisiana, safety laws and regulations mandate that infants through children age 12 are required to be restrained in all seating positions and children ages 2 and under must be properly restrained in an appropriate child safety seat [1].

**Methods**

In an effort to assess the use of child safety seats among children aged infant to 5 years, an observational study was conducted in Region VI over a 10-week period during the Spring of 2002. The study areas were selected in an effort to obtain a representative sample of children aged 5 and under (priority population) in the area. The observations were conducted by two persons and were done at all eight of the parish health units, on days when child health services were scheduled, and at the major shopping center in each parish throughout Region VI. Observers remained at each site for one hour and recorded all children in observed vehicles at each site. Information collected included: demographic information on both the driver and child passenger (ages were estimated and later categorized), vehicle type, safety seat type and position, location of the child in the vehicle, use of seat belt by the driver, and location of the observation. All recorded information were entered into a database, and the software package, SPSS Version 10.0 was used for data analysis.

**Results**

A total of 270 children were observed throughout the region. Of this number, 54.3% were observed to be male children and 45.7% were observed to be female children. The gender for 5 of the observed children could not be determined. A majority of the children observed were White (68.9%); African American children represented 28.9% and other children accounted for 2.2%. Table 1 shows the demographic distribution of all the children observed.

**Table 1. General Demographics of the Children Observed (N=270)**

| | | | |
|---|---|---|---|
| **Gender** | **Male** | **Female** | **Unknown** |
| | 144 (54.3%) | 121(45.7%) | 5(1.9%) |
| **Ethnicity** | **White** | **African American** | **Other** |
| | 186 (68.9%) | 78(28.9%) | 6(2.2%) |
| **Age Group** | **≤ 1year** | **1-5yrs** | **≥ 5yrs - < 13yrs** |
| | 38 (14.1%) | 206 (76.3%) | 26 (9.6%) |
| **Location In vehicle** | **Back** | **Front** | |
| | 186 (68.9%) | 84 (31.1%) | |

Of the 270 children observed, 244 were estimated to be less than or 5 years old (priority population), and 26 were estimated to be more than 5 years old. More than half of the priority population was observed to be traveling in the back seat of the vehicles (73.8%); however, only 35.7% (N=87) of them were observed to be in child safety seats. Of the children who were in child safety seats 24.2% (n=59) were in forward facing seats, and 11.5% (n=28) were in the infant only seats (7% in rear facing carriers and 4.5% in rear facing seats in a vehicle). The remaining children were either restrained by the car's seat belt (9.4%, n=23), sitting on the lap of an adult, or another child (6.1%, n=15), or not restrained at all. Of the children who were more than 5 years of age, 23.1% (n=5) rode in the back seat of the vehicle, 3.8% (n=1) rode in a booster seat, and 34.6% (n=9) were restrained with the car's seat belt. Table 2 shows the age distribution of all children observed to be restrained by child safety seats or the car's seat belt.

**Table 2. Method of restrain by age group (N=120)**

| Age Group | Child Passenger Safety Seat Number (%) | Car seat belt Number (%) |
|---|---|---|
| **<1 year** | **30 (34.1)** | **1 (3.1)** |
| **1-5 years** | **57 (64.8)** | **22 (68.8)** |
| **>5 years** | **1 (1.1)** | **9 (28.1)** |
| **Total** | **88 (100)** | **32 (100)** |

A total of 207 drivers were observed. White drivers made up 73.4% (n=152) and African American drivers made up 26.6% (n=55) of the drivers. There were also more female drivers (75.4%) than male drivers (24.6%). Of the drivers observed, 55.1% (n=114) wore seat belts (24.6% were male and 74.4% female). The estimated age of the drivers were categorized and most of them were between the ages of 21-30 years (49.3%) and 31-40 years old (29%). The other age groups, 16-20, 41-50 and >50 accounted for 4.3%, 11.6% and 5.8% of the drivers, respectively.

Among the 114 drivers observed to be wearing seat belts, a total of 101(88.6%) were the drivers for the 244 children aged 5 and under. Among the priority population, a total of 133(54.5%) children traveled with restrained drivers, and among the 87 children who were observed to be traveling in child safety seats, 57(65.5%) traveled with drivers who were restrained and 30(34.5%) traveled with drivers who were not restrained. On the other hand, a total of 76(31.1%) children who were not restrained traveled with drivers who were themselves restrained, leaving a slightly greater number of unrestrained children (n=81, 33.2%) traveling

with drivers who were also not restrained. For children aged 5 and under who were restrained in a child safety seat, most were traveling with drivers who were either within the estimated 21-30 year age group (n=46 children), were female (n=62 children), and/or were white (n=59 children). According to the results of the following 2x2 table, it is important to note that the children who traveled with restrained drivers were more likely to be restrained than those who did not (X2=6.61; p-value=0.01).

| | | **Drivers** | | |
|---|---|---|---|---|
| | | Restrained | Not restrained | Total |
| **Children** | Retrained | 57 | 30 | 87 |
| | Not restrained | 76 | 81 | 157 |
| | Total | 133 | 111 | 244 |

$\chi^2$=6.61; p-value=0.010

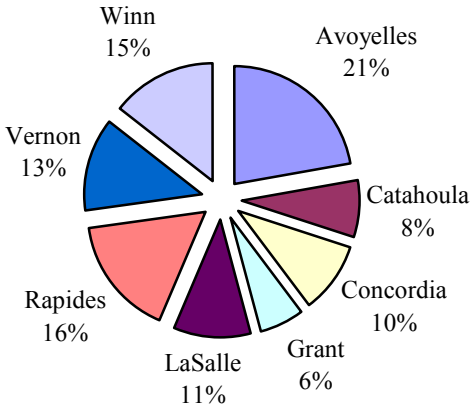
Most of the 207 vehicles observed were in good condition (83.1%). Only 12.1% (n=25) of the vehicles were observed to be in fair condition and 4.8% (n=10) were in poor condition. Sixty-four vehicles (30.9%) were observed at the health units, 128 (61.8%) were observed at the shopping centers, and 15 (7.3%) were observed on the highways within the city limits. Results on the type of vehicle driven are presented in Table 3.

**Table 3. Type and number of vehicles observed (N=207)**

| Vehicle Type | Number observed (%) |
|---|---|
| Bus | 1(0.5%) |
| Compact car | 139 (67.2%) |
| Sports Utility Vehicle | 15 (7.3%) |
| Truck | 36 (17.4 %) |
| Van | 15 (7.7%) |

Figure 1 shows the distribution of observed cases by parish.

**Figure1. Distribution of observations according to parish**



A total of 128 observations were made at the shopping centers throughout the region, and from these observations, a total of 114 children were estimated as being 5 years or less. Of these children, 68.4% (n=78) were in the back seat of the vehicles, and 31.6% (n=36) rode in the front seat. Moreover, a total of 36 (31.6%) children were restrained in child safety seats, leaving a total of 78 (68.4%) children unrestrained. Of the 78 children who were not restrained, 10 were secured with the car's seat belt and 8 sat on an adult or on another child. The following 2x2 table illustrates the number of children and drivers according to their restrain status.

| | | **Drivers** | | |
|---|---|---|---|---|
| | | Restrained | Not restrained | Total |
| **Children** | Retrained | 27 | 9 | 36 |
| | Not restrained | 38 | 40 | 78 |
| | Total | 65 | 49 | 114 |

($\chi^2$=6.91; p-value=0.008)

Although the number of children who were not restrained and who traveled with drivers who were also not restrained was high (n=40), the likelihood of a child being restrained while traveling with a driver who was also restrained was statistically significant ($\chi^2$=6.91; p-value=0.008).

**Discussion**

Riding unrestrained is the single greatest risk factor for death and injury among child motor vehicle occupants. Moreover, a child who is among the 29% of children aged 4 and under who are transported unrestrained is at twice the risk of death and injury as those who are restrained in vehicles [(1)]. In this study, although the priority population consisted of children aged 0-5 years old, data for all children observed were recorded. Results indicated that only 35.7% of the children aged 5 or less were restrained while being transported, indicating a high risk for injury or death in the event of a crash. It is estimated that children aged 12 and under are up to 36% less likely to die in a crash if they are in the rear seat of a passenger vehicle [(1)], and in this study, despite the low number of restrained children, a significant number (73.8%) of them were appropriately placed at the back seats of the vehicles, posing a lower risk of injury to them in the event of a crash.

Although it is recommended that all children aged 5 and under should be in an appropriate child passenger safety seat, quite a few were restrained by the car's seat belt 9.4% (n=23) with one of these children estimated as being less than one year old. In the state of Louisiana, the laws mandate that children age two and below should be in an appropriate child safety seat, and all others up to the age of twelve should be restrained. This mandate most certainly poses an increased risk for injury for the children more than 2 and less than 12 years of age who are not restrained properly. It is critical to note that a vast majority of the children aged 5 or less who were in child safety seats (n=57) were traveling with drivers who were restrained, indicating that drivers' use of seatbelts may be indicative of a child passenger being restrained as well ($\chi^2$=6.61, p-value=0.010). In essence, it is important to note that any education or intervention focused on increasing the use of child safety seats should be coupled with education/awareness interventions for the increased use of seat belts among drivers as well.

Despite the fact that most of the drivers observed were white, results showed that use of the seat belts were higher among the White, female drivers compared to African American female drivers, or male drivers on a whole. Also, results indicated that the number of children who were in child safety seats were higher among drivers who wore their seat belts. It would be interesting to conduct further studies in this area to determine whether children who travel with restrained drivers, and particularly white female drivers, are at a lesser risk of injury than those who travel with other drivers. Based on the results of this study, it should be noted that the enforcement of or the implementation of primary regulations for the use of seat belts among all drivers, and especially among those who are less likely to wear seat belts may aid in increasing the use of child safety seats for child passengers, thus decreasing the risk of injury and death during crashes.

The ethnic makeup of the study sample is comparable to the general ethnic makeup of the region. The time of day that the observations were conducted, the small sample size and the limited number of observations made in the more populated parishes may limit the generalization of the study results to the wider region. Also, females made up a large number of the parents observed, especially at the health units, possibly indicating a certain group within the population, such as stay-at-home mothers, mothers who are not employed or those who may be partially employed, eliminating mothers who are employed and those who actually take their children to the daycare. Moreover, in most instances, the female parent tends to be the one who generally takes a child for medical care. In light of this, the results of this study may not be readily generalized to the region, as a whole, though it is significant enough to enforce/establish laws/regulations and education that foster the use of child safety seats and/or proper restrain for all child passengers and the use of seat belts among drivers.

**Conclusion**

In an effort to continue the enforcement of child safety seats, it is essential that public health, the community and lawmakers work together. The results obtained from this observational study showed that a majority (73.8%) of the children age 5 and under rightly traveled in the back seats of the vehicles. Due to the high incidence of injury suffered by child passengers who are not properly restrained, and although restrain in vehicles is highly recommended for the priority population, less than half (45%) of the children observed were restrained in any way in the vehicles (35.7% restrained in child passenger safety seats and 9.5% restrained by the car's seat belt). This low number of children observed to be restrained clearly indicates an increased risk for injury during a crash among children in the region. Moreover, although Louisiana law mandates that children under age 12 to be properly restrained when traveling in vehicles and that children age 2 and under should be in child safety seats, it is evident that this law is not strictly enforced. In light of this, and to decrease the incidence of death and injury that child passengers may suffer during crashes, stricter regulations and the enforcement of already established laws need to be in place in the region.

**Recommendation**

Interventions are a key to reducing risk of fatal crashes among children. Some intervention measures can include:

- Enforcement of existing laws
- Full proof child safety laws
- Education and routine car safety seat checks

- Awareness of the injuries that can occur to unrestrained children
- Provision of car safety seats to low income families
- Educational materials or fines for the inappropriate transportation of children
- Enforcing the use of safety belts among drivers which may aid in increasing the use of child safety seats

**Sources**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